

Claims

What is claimed is:

- 1 1. A method of defining a device color profile, comprising: ✓
 - 2 (a) storing a first set of color descriptions, wherein each color
 - 3 description describes a color of a different printed test patch in a first target
 - 4 and includes: (i) a set of color component values defined in an overlapping
 - 5 color space, and (ii) at least one color component cross term;
 - 6 (b) obtaining a second set of color descriptions, wherein each color
 - 7 description in the second set describes a color of a different printed test patch
 - 8 in a second target and includes: (i) a set of color component values defined in
 - 9 the overlapping color space, and (ii) at least one color component cross term;
 - 10 and
 - 11 (c) using the stored first set of color descriptions and the second set
 - 12 of color descriptions to define a device color profile.
- 1 2. The method of claim 1, wherein the overlapping color space is in
- 2 accordance with the CIE 1931 standard observer.
- 1 3. The method of claim 1, wherein the first target includes more
- 2 test patches, the second target and the overlapping color space is in
- 3 accordance with CIE 1964 standard observer.
- 1 4. The method of claim 1, wherein the act of obtaining includes:
- 2 using a colorimeter to measure the color of a printed test patch
- 3 in the second target so as to generate a set of XYZ values; and
- 4 computing color component cross term from the set of XYZ
- 5 values.
- 1 5. The method of claim 1, wherein the method is performed by a
- 2 color printing device.
- 1 6. A color printing device, comprising: ✓
 - 2 (a) at least one memory storing a plurality of color.

3 descriptions each describing a color of a different test patch in a master target,
4 wherein each one of the color descriptions include a set of color components
5 and at least one overlapping cross term;

6 (b) a colorimeter; and

7 (c) a control system operable to:

8 print a re-characterization target that includes a plurality of re-
9 characterization test patches;

10 control the colorimeter to measure the color of each of the
11 printed re-characterization test patches; and

12 compute a device color profile using the color measurements of
13 the printed re-characterization test patches and the plurality of color
14 descriptions stored in the memory.

1 7. The color printing device of claim 6, comprising:

2 (e) a media transport system; and wherein the control system if
3 further operable to control the media transport system to move at least one
4 media that includes the printed re-characterization test patches in proximity to
5 the colorimeter to enable the colorimeter to measure the color of each of the
6 plurality of test patches.

1 8. The color printing device of claim 6, wherein the re-
2 characterization target includes a lesser number of test patches than the
3 master target.

1 9. The color printing device of claim 6, wherein the set of color
2 components are XYZ tristimulus values.

1 10. The color printing device of claim 6, wherein the memory also
2 stores the re-characterization target.

1 11. A characterization system, comprising: 

2 (a) means for accessing a first plurality of color descriptions each
3 describing a color of a different printed test patch in a printed master target;

4 (b) means for generating a second plurality of color descriptions
5 each describing a color of a different printed test patch in a printed re-
6 characterization target;

7 (c) means for computing a device color profile from the first plurality
8 of color descriptions and the second plurality of color descriptions; and
9 wherein each of the first plurality of color descriptions and each
10 of the second plurality of color descriptions include a set of color components
11 that describe a color and at least one overlapping cross term.

1 12. The characterization system of claim 11, wherein the re-
2 characterization target includes a lesser number of test patches than the
3 master target.

1 13. The characterization system of claim 11, wherein the means for
2 accessing includes a memory that stores the first plurality of color descriptions.

1 14. The characterization system of claim 11, wherein the means for
2 generating includes a colorimeter for measuring the printed test patch in the
3 printed re-characterization target.

1 15. The re-characterization system of claim 11, wherein the
2 characterization system is incorporated within a printing device.

1 16. The characterization system of claim 11, wherein each of the
2 first plurality of color descriptions and each of the second plurality of color
3 descriptions include a set of XYZ tristimulus values that describe a color and at
4 least one ZYZ overlapping cross term.

1 17. The characterization system of claim 11, wherein each of the
2 first plurality of color descriptions and each of the second plurality of color
3 descriptions include a set of RGB values that describe a color and at least one
4 RGB overlapping cross term.

1 18. One or more computer-readable media having computer
2 executable instructions embodied thereon which, when executed by one or
3 more processors in a printing device, cause the one or more processors to:
4 (a) use a first plurality of color descriptions and a second set of
5 color descriptions to compute a device color profile;

6 wherein each of the first plurality of color descriptions describe a
7 color of a different test patch of a first plurality of test patches in terms of at
8 least three color component values and at least one overlapping cross term;
9 and

10 wherein each of the second plurality of color descriptions
11 describe a color of a different test patch of a second plurality of test patches in
12 terms of at least three color component values and at least one overlapping
13 cross term.

1 19. The one or more computer-readable media of claim 18, wherein
2 the computer executable instructions cause the one or more processors to:

3 (b) access the first plurality of color descriptions from at least one
4 memory;

5 (c) access the second plurality of color descriptions from at least
6 one memory.

1 20. The one or more computer-readable media of claim 18, wherein
2 the computer executable instructions cause the one or more processors to:

3 (b) access the first plurality of color descriptions from at least one
4 memory in a printing device;

5 (c) generate the second plurality of color descriptions using output
6 received from a colorimeter incorporated within the printing device;

7 wherein the second plurality of test patches is less than the first
8 plurality of test patches.

1 21. The one or more computer-readable media of claim 18, wherein
2 the first and second plurality of test patches are printed.

1 22. The one or more computer-readable media of claim 18, wherein
2 the first and second plurality of test patches are displayed.

1 23. A method of defining a device color profile, comprising: ✓

2 (a) printing a first plurality of test patches on a first media type;

3 (b) using a colorimeter to measure the color of each printed test
4 patch included in the first plurality of printed test patches to obtain a set of XYZ
5 tristimulus values;

6 (c) first storing a color description of each printed test patch
7 included in the first plurality of test patches, where the color description
8 includes a set of XYZ tristimulus values and at least one XYZ cross term;
9 (d) printing a second plurality of test patches on a second media
10 type;
11 (e) using the colorimeter to measure the color of each printed patch
12 included in the second plurality of printed test patches;
13 (f) second storing a color description of each printed test patch
14 included in the second plurality of test patches, wherein the color description
15 includes a set of XYZ tristimulus values and at least one XYZ cross term;
16 (g) using the color descriptions stored in the first storing act and the
17 color descriptions stored in the second storing act to define a device color
18 profile.

1 24. The method of claim 22, wherein the first media type is different
2 than the second media type.

1 25. The method of claim 22, wherein the number of patches in the
2 first plurality of printed test patches is more than the number of patches in the
3 second plurality of test patches.

1 26. The method of claim 22, wherein act (a) and act (d) is
2 performed by a color printing device.